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ABSTRACT

Research in rural health has multiplied rapidly in recent years. Although there is currently no shortage of studies and questions, the want of answers remains. Despite a substantial investment in a variety of rural health care programs, there is inadequate information as to their effectiveness. Programs designed to increase the supply of health personnel to rural areas have met with mixed success; sites staffed by National Service Corps personnel show consistently lower productivity than sites under other sponsors. A persistent problem is the expectation that many rural health care programs must become financially self-sufficient, for stringent enforcement of this requirement may mean that those who need the services most will be least likely to receive them. Rather than focusing merely on a review of the published literature, this study directs attention toward ongoing research, examines unanswered questions, and suggests a framework for future coordination of research and evaluation efforts in the field. Particular emphasis is given to questions on access, manpower, and financing. The current state of knowledge in both published and unpublished literature in each area is summarized and a series of unresolved issues is raised. The bibliography cites 162 references, most of which were published since 1974. (AUTHOR/DS)

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AN OVERVIEW OF RURAL HEALTH CARE RESEARCH

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AN OVERVIEW OF RURAL HEALTH CARE RESEARCH

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April 1978

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AN OVERVIEW OF RURAL HEALTH CARE RESEARCH

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SUMMARY

This paper reviews the state of the art of rural health research and evaluation with particular emphasis on the questions of access, manpower and financing. The current state of knowledge in both the published and unpublished literature in each area is summarized and a series of unresolved issues is proposed. A strategy for further research to include the various types of rural health care programs is described.

Major findings suggest that, although rural populations do have somewhat less access to care than urban populations, our ability to precisely quantify the extent and importance of this discrepancy is underdeveloped. Despite a substantial investment in a variety of rural health care programs there is inadequate information as to their effectiveness. Programs designed to increase the supply of health personnel to rural areas have met with mixed success. Sites staffed by National Service Corps personnel show consistently lower productivity than sites under other sponsorship. Non-physician manpower (physician assistants and nurse practitioners) offer a promising source of primary care for rural areas; recent legislation that reimburses such care should increase their utilization.

A persistent problem is the expectation (often a mandate) incorporated into many rural health care demonstration efforts that the programs become financially self sufficient in a finite period of time.

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Self-sufficiency is a function of utilization, productivity and the ability to recover charges for services. In many instances stringent enforcement of the self-sufficiency requirement may mean that those who need the services most will be least likely to receive them.

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I. INTRODUCTION

The current conundrums of the American health care system--financing, accessibility and quality--take on added complexity when attention is focused on rural areas. Rurality implies a geographic dispersion of a relatively small number of people. This geographic maldistribution is accompanied by a set of social, cultural and economic values which figure prominently in the rural dwellers' perceptions of their health needs and expectations of the systems designed to meet them. These are often as diverse as the physical characteristics of the areas in which they live.

Within the last few years researchers and policymakers alike have demonstrated increasing interest in the problems attendant to delivering health care services in rural areas. Research in rural health has multiplied rapidly in recent years and although there is currently no shortage of studies and questions, the want of answers remains.

Rather than focusing merely on a review of the published literature,* this study attempts to direct attention toward ongoing research, to examine the remaining unanswered questions and unresolved issues and to suggest a framework for future coordination of research and evaluation efforts in the field.

There are several problems which plague any discussion of rural health care, problems of definition and expectation. It is therefore imperative that our premises be made clear before we attempt to assess the state of the art.

1. Diversity of rurality. Experts and laymen alike have a propensity for putting all non-urban areas into a single category. While this is useful in distinguishing them from cities it may be seriously misleading for any discussion of rural health problems. Too often it is assumed that

*There are at least four recent reviews available to the interested reader (Wright 1976, Kane 1976, Hassinger and Whiting 1976, Cordes 1977).

because two things are different from the same thing, they are therefore alike. In reality, various rural areas may be as unlike each other as they are non-metropolitan. The impoverished rural communities of the Deep South may have more in common with some urban ghettos than the lush farmland of the Midwest. Rural communities are defined not merely by geography and population density but also by the residents, their values and their lifestyles. Obviously these vary with the culture and socio-economic conditions of the specific rural population under discussion.

2. Medical care may be only distantly related to health status. Despite a plethora of pronouncements to the contrary, there remains a tendency among some persons in the field to assume a close relationship between a population's health status and the amount of available health care. Awareness is increasing, however, that there are many factors which impinge on health status, not all of which are susceptible to improvement by medical intervention. Any useful examination of the questions of rural health care must be preceded by clarification of our beliefs about the extent to which that care meets the goal of improving health status and the degree to which it fills other needs.

For example, there are clearly areas of the country where an investment in basic health programs to improve sanitation, water supply and nutrition pays large dividends in reducing mortality and improving the quality of life. As a population becomes more affluent, however, lifestyle becomes a more important factor. In both circumstances, much of traditional medical care may be viewed as adjunctive. This fact apparently has not dimmed enthusiasm for seeking and supporting medical care but implies rather that it meets needs beyond the reduction of morbidity and mortality rates. This elusive function must be considered in any discussion of the need for medical services.

This question becomes increasingly complicated when we confront the limitations of available resources. Choices must be made among alternative investments and community wishes must be reconciled with professional judgments. To what extent for example, should sanitation be substituted for a part of the direct provision of traditional medical services (or added to it)? The people who would be affected might not be satisfied with such a trade, and current financing mechanisms do not recognize it

as legitimate; they will often cover one but not the other, depending on the specific mandate.

3. Regionalization as a planning tool. That regionalization presents the most efficient way of distributing services to a dispersed population has been recognized for some time. This form of pyramidal organization requires a free flow of information and a high degree of cooperation. It allows for centralization of the expensive, highly technical, rarely used services and makes the more common primary care services available closer to each person's home. Regionalization is not a new concept (Bridgman 1955, Seipp 1963) but it is apparently staunchly resisted. We have learned relatively little in these twenty years about how to encourage communities to yield some autonomy in order to share in larger enterprises. (McNerney and Riedel 1962, Saward 1976)

4. Reasonable expectations. Frequently our stated social goals are in direct conflict with one another. For example it is probably quixotic to assume that increasing the access of rural dwellers to health care services will be compatible with the goal of cost containment. Furthermore, although we may assert that all persons are entitled to equal health care, in reality our policy reflects something different: Although we have established a concept of minimal levels of services that should be available to all, this is not equivalent to equity. A rural existence implies suffering certain inconveniences of shortages along with reaping other rewards. A scarcity of social resources, including health care, is one of the by-products of rural life.

At the outset we posit several conclusions about what is known in the rural health care field, to be expanded in the text:

1. Although it is difficult to define precisely the health needs of rural communities, one can identify different levels of development. For those economically disadvantaged areas lacking basic public health services, investments in these are likely to show greater effects on health status than are investments in more traditional care. (McKeown 1976) In the more affluent rural communities, accessible health care may be something desired for its own sake or for its perceived effects on health status, even in the absence of demonstrable proof of such a relationship.

2. Despite the growing number of physicians being trained, it is still difficult to recruit and retain them in rural practice. The factors most significantly associated with rural location choice are the rural background of the physician and spouse, and training in general/family practice.

3. Physician extenders* (PEs) have been more likely to settle in rural areas than physicians. They can provide a significant proportion of the primary care offered by physicians at comparable quality. In addition, technology is available to facilitate communication between PE-staffed satellite clinics and supervising physicians. Up to the present the widespread use of PEs has been hampered by legal restrictions on their right to practice and by a reimbursement policy that precluded their direct payment for services.

4. Economic self-sufficiency for a clinic requires adequate utilization by a large population or very active participation by a small one. Many areas that seek a physician don't use his/her services once (s)he arrives. Often when a readily accessible source of care is provided, people will maintain previously established medical relationships.

5. There are more rural hospitals and hospital beds than can be justified in terms of contemporary norms or current utilization rates. Flexible use of these facilities, for example in staffing patterns or bed classification, may improve their financial plight and provide a better rationale for maintaining them.

6. A number of programs have been launched in recent years to increase the amount and quality of rural health care. Although their specific requirements and provisions differ, they share a number of common features and may, in fact, overlap so that a single site uses funds from several programs simultaneously.

There is a larger universe of questions about rural health care in need of answers. Stellar among these are:

1. How much money (specifically federal dollars) is spent for rural health care? How much for rural health research and evaluation?

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*We will use this term to refer to non-physician providers (mainly physician assistants and nurse practitioners).

2. Is there a useful definition(s) of "rural"?
3. How can more health personnel be enticed to rural areas?
4. What expected change in the health status of a population is necessary to justify increased investment in health services? What other variables are important?
5. What is the minimal access to care that should be available to every rural resident? To what extent should the concept of "equity" be involved?
6. Is the lower use of health services in rural areas an indication of poorer access to care or of greater self-reliance?
7. What factors can be used to predict the likelihood that an adequate number of people will use a facility to assure its self-sufficiency?
8. What are the factors that determine the success of a rural health project? Should the same criteria of success be applied to demonstration efforts and ongoing programs?
9. Can prepaid health care systems (i.e. capitation) work in rural settings?
10. Will more equitable payment of health care providers attract an increasing number to rural areas? What other factors are necessary?
11. What is the optimum level of community participation in the recruitment, retention and support of health care delivery systems? How can this be achieved?
12. To what extent and under what circumstances will the provision of outreach and preventive services lead to reduced health care costs?
13. How can the payment system encourage the efficient provision of adequate services without increasing the cost of care?
14. Who, ultimately, is responsible for delivering health care in rural areas?
15. How will a program of national health insurance affect the availability of care in rural areas?

This brief overview of some salient aspects of the rural health care field alludes to several major problems and policy-relevant issues which will be addressed below. The discussions focus on the main areas of access, health personnel, and financing (an admittedly artificial separation in some instances) and include a series of questions about rural health suggesting areas requiring further research. A concluding section provides an assessment of previous research methodologies, an overview of ongoing studies and a proposal for future research and evaluation directions.

II. ACCESS

There is a general perception that people living in rural communities have less access to health care resources than do their urban counterparts. As with most common sense assumptions, this is basically true. The issue of greater concern, however, is whether they have enough access, which raises the problem of what operational definition to use.

Perhaps access is best viewed in the obverse, i.e., the absence of barriers to care. These barriers may be physical (travel distance), temporal (delays in getting an appointment, waiting times in the office), financial, cultural, linguistic or even attitudinal. The most fundamental barrier is of course the lack of available resources for care. Several basic models are available to explain the use of services. (Andersen 1968, Rosenstock 1966, Kane et al. 1976a).

The crudest measure of access is some form of provider to population ratio. One can talk about the counties with no physicians or compare the physician per 1000 population ratios in rural and urban areas. On a slightly more sophisticated level one can estimate the number of physicians necessary to provide some basic level of services. Schonfield et al. (1972) for example, arrive at a theoretical estimate of 133 primary care physicians per 100,000. Scitovsky and McCall (1976) use data from a prepaid comhensive group practice to suggest a figure more in the range of 83 per 100,000.

Discussions of access often depend on some set of proxy measures such as utilization of services, or, more recently, utilization rates controlling for the variable of need. Unfortunately, although the latter method may provide a more meaningful assessment, it in some ways compounds the difficulties. The existing measures of need are also imprecise and entanglement in distinctions between need and demand seems inevitable (Jeffers et al. 1971)

Relatively gross national data suggest that more indicative gauges are required. For example, data from the National Center for Health

Statistics indicate that the average number of visits made to a physician per person in 1975 was 3.9 in rural areas compared with 5.4 in the largest metropolitan areas. In addition, 71 percent of rural inhabitants saw a physician at least once in 1975 compared with 76 percent in metropolitan areas. However, these figures do not reveal that the rural residents reported poorer health status, that they used some preventive services less and used nonsurgical hospitalization more than urban residents. (Kleinman and Wilson 1977)

National data on the relative access of rural and urban populations have been made available by the Center for Health Administration Studies of the University of Chicago. The summary in Table 1 suggests that rural populations, particularly farm-dwellers, are at some disadvantage compared with urban and suburban populations, but perhaps not so great a disadvantage as might have been assumed. Rural residents use physicians less, but they do tend to have a regular source of care within 30 minutes' travel time from their homes. Most visits are scheduled appointments for which they have generally only waited a few days. Nevertheless, two factors emerge which may reflect the plight of the high volume rural physician: Rural patients have longer office waits and spend less time with the physician than their urban counterparts. The usual caveats about aggregated data hold in considering these data. Furthermore, even striking differences in pockets of rural poverty will not emerge from this national sampling.

The most commonly used measures of access share a bias toward acute care. Although the availability of services for acute problems is important, the total health care needs of rural residents must be considered. Consistent with the age distribution of this group, rural dwellers exhibit a high prevalence of chronic conditions. Data from the 1974 National Health Survey indicate that 15.8 percent of the rural non-farm population have some limitation of activity due to chronic conditions--this proportion rises to almost 50 percent among those over 65--compared with an urban rate of 13.4 percent. (Series 10, No.111, 1977) A study by Systemetrics Inc. of five rural clinics in Portage, Pa. supported under the HURA program found that 43 percent of the patients seen had one or more chronic diseases.

Table 1: Measures of Utilization & Access

	Rural		Non-SMSA	SMSA	
	Farm	Non-farm	Urban	Central City	Other Urban
Utilization measures					
% of people seeing a physician in the years					
1970	62	68	71	65	72
1976	68	75	73	77	78
Mean number of physician visits per year in 1976					
per person	2.7	3.8	3.9	4.6	4.1
per person seeing a physician	4.0	5.1	5.4	6.0	5.3
Access measures					
Type of regular source of care in 1976					
% particular MD/DO	88	84	85*	71	77
% no " "	5	6	6	14	10
% none	7	10	10	15	13
Travel time to regular source of care in 1976					
% < 15 minutes	27	35	69	50	51
% 15-30 minutes	58	51	26	43	42
% 30-60 minutes	13	11	4	6	6
% > 1 hour	2	3	1	1	1
Appointment arrangements at regular source of care, 1976					
% appointments	77	75	79	79	85
% walk-in	23	25	21	21	15
Appointment waiting time at regular source of care, 1976					
% same day-2 days	62	66	67	57	66
% 3 days-2 weeks	32	27	26	35	27
% > 2 weeks	6	7	7	9	7
Office waiting time at regular source of care, 1976					
% 30 min. or less	53	59	57	67	69
% 31-60 minutes	28	24	28	20	22
% > 60 minutes	20	17	15	14	9
Time usually spent with doctor at regular source of care, 1976					
% < 15 minutes	33	30	31	24	27
% 15-25 minutes	52	52	55	51	53
% > 25 minutes	15	17	15	25	20

*Some percentages do not total 100% due to rounding errors.

Source: Aday, L.A. and Andersen, R., Final Report to Robert Wood Johnson Foundation on Utilization of Health Services, Center for Health Administration Studies 1978 (forthcoming). Tables 2.1, 2.4, 2.7, 2.9, 2.11, 2.14, 2.16, 3.1, 3.4 and 3.6.

Adequate measures of access therefore, need to accommodate pertinent characteristics of the population and to allow for estimations of the levels of care appropriate to the anticipated needs. Access must be viewed as a flexible concept, one which takes cognizance of the social and cultural aspects of the population in question.

The federal government has used two basic measures in determining areas with inadequate access to health care, both of which are related to the availability of health personnel: The Medically Underserved Area (MUA), and the Critical Health Manpower Shortage Area (CHMSA), now called the Health Manpower Shortage Area (HMSA). Table 2 offers a brief summary of these designations.* Both of these measures have been the subject of considerable discussion. The MUA, based on the Index of Medical Underservice developed at the University of Wisconsin (1975), assumes a relationship between relatively available measures of health status and the utilization of physician services. It has been criticized as confounding these factors with measurement of socioeconomic variables. (Kushman 1977, Wysong 1975) Moreover, this linkage of health status and physician availability, it is argued, takes no account of the area's need for resources, the patterns of utilization and the quality of the existing resources. (Kleinman and Wilson 1977) The CHMSA/HMSA designation is basically a simple ratio of primary care physicians per capita for an area, with adjustments made for the availability of such personnel in adjacent areas and special circumstances that demand more than average levels of primary care services.

Both of these designations make several assumptions about health care utilization patterns in rural areas which do not always hold. It does seem intuitively obvious that people will be more likely to make greater use of facilities which are close at hand, and there is some data to support this. (Shannon et al. 1969, Shannon et al. 1973, Shannon 1977, Weiss et al. 1971) Some researchers have begun exploring the relationship among consumer preferences for cost, travel time and waiting time in choosing sources of primary care. (Koutsopoulos et al. 1977)

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*For more detail on the history and conceptions of health manpower shortage areas see Proceedings of the Workshop on Health Manpower Shortage Areas, DHEW Pub No. (HRA) 77-51, April 1977.

Table 2: Measures of Manpower Shortage Areas

	Medically Underserved Area (MUA)	Critical Health Manpower Shortage Area (CHMSA)	Health Manpower Shortage Area (HMSA)
Geographic unit	county, census tract or census division	county, group of census tracts or group of census divisions	designated area, population groups of facility
Basis of calculation	weighted combination of infant mortality rate, physician/pop^{n} ratio, % pop^{n} 65+, % pop^{n} below poverty level	<1 primary care MD per 4000 people (adjusted for contiguous areas)	<1 primary care MD per 3500 people or <1 per 3000 if specific indicators of need (adjusted for contiguous areas)
Programs affected	CHC, HURA, HMO PL95-210	NHSC, HURA	NHSC, PL95-210
No. of areas designated	1697 (1977)	(1977) MD 1106 DDS 854	(est. 1978) MD 1300 DDS 950

Looking directly at the costs of traveling for care from four rural Illinois communities, Cowen and Frate (n.d.) calculate that use of the locally available services could save each family an average of $39 and 8 hours in a year. In one controlled trial, the provision of a nurse practitioner in a remote rural community resulted in a dramatic local shift in the geographic pattern of care receipt as well as in a modest increase in the total amount of primary care utilized. (Chambers et al. 1977)

There are, however, several studies which suggest that rural dwellers will travel significant distances to obtain certain types of care, even in some cases bypassing more available resources. (Kane 1969, Kane 1975) It is not safe to assume that the patterns of medical care utilization will necessarily parallel those of other goods and services. (Kane 1975, Kane et al. 1978a) Several efforts to study the way rural residents seek care suggest that the answer lies not simply in placing more resources. (Hassinger and Whiting 1976) The introduction of a new facility or new provider in the immediate area may create a dilemma for the rural health consumer: The value of more accessible care must be weighed against the risk of disrupting an established, if less convenient, pattern of care. Not surprisingly, there may be some delay in transferring loyalties, and in some cases it may never occur. (Kane et al. 1978b)

Nevertheless, the effect of geographic and financial barriers to health care is likely to be greatest on those services which are viewed as being most elective. Much of what we list under prevention and primary care would fall into this category. Thus, if a social goal is to increase the utilization of such care by certain sub-groups, access is an important consideration and will require a more precise definition.

Several alternate measures of access do take into account some of these factors of need, convenience and utilization of care. Aday and Andersen (1975) have reviewed a number of these alternatives.* Their use-disability ratio is one access measure which compares the number of physician contacts per 100 days of restricted activity and/or confinement to bed for a group in a two-week period.

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*This volume also contains a substantial bibliography and resource list for other measures of access.

Comparative data for this index is shown in Table 3. Although this measure does not distinguish between preventive and curative visits, nor does it establish a causal relationship between physician use and disability, (Copp 1976) it does suggest that with the exception of the category "poor, under 65," rural residents have less access to health care services than urban dwellers. This conclusion is substantiated by other measures of access used by these investigators, such as the percentage of persons in a group with disability days who contact a physician within a two-week time period.

Aday and Andersen have also utilized a method to include the measure of need as a component of access. Their symptoms-response ratio reflects the difference between the number of people with a given mix of symptoms who contact a physician at least once for the symptoms, and the number of people that a panel of medical professionals believe should contact a physician for the symptoms. Once again the rural population reflect less access than urban dwellers.

Eichhorn and Maurana (1976) have undertaken a study focusing on the use of needed physician services within a community and the factors affecting it. They are using a systems approach to integrate attributes of the population, health care resources, barriers to care and the use of needed services.

Regardless of the measures used, there are many areas of America which can be identified as needing improved access to care for their residents. An implicit element of these considerations is the concept of equity. Not to be confused with equality, equity implies a right to a certain level of services regardless of the evenness of the distribution. One method for assessing equity might take cognizance of special needs due to illness patterns; another might be sensitive to sociocultural patterns; and still another might be based on a claim that the value of having rural populations justifies a disproportionate investment in their health care. Over the last several years, the federal government has instituted a number of programs designed to accomplish this goal. Many of them are housed within the Health Services Administration's Bureau of Community Health Services (BCHS). Table 4 summarizes several of these programs.

Table 3: Use-disability ratios* for whites

		Rural	Urban
Under 65 . . .	poor	11.03	9.83
	non-poor	14.08	16.84
65+	poor	7.15	11.80
	non-poor	15.69	21.32

* Number of physician visits per 100 days disability.

Source: Aday & Andersen, *Development of Indices of Access to Medical Care*. Ann Arbor: Health Administration Press, 1975.

Table 4: FY1977 Budget & Growth of Community Health Centers, Rural Health Initiative & Health Underserved Rural Area Programs

	CHC*	RHI	HURA
FY77 Budget ($ million)[1]	183.9	23.6	15
No. of projects			
FY75[2]	47	56	9
FY76[2]	138	191	53
FY77[1]	158	262	88
FY78 est.[1]	158	356	106
FY79 est.[1]	158	441	106

*Ongoing CHC's only; does not include Adolescent Health Initiative, Child Health Assessment Program, UHI.

Sources: 1) Justification of Appropriations. Estimates for Committee on Appropriations (FY1979 Vol.1), Public Health Services Summary for Health Services Administration, 1977 Appropriations Committee on Health Services, p.51.

2) Health Services Administration Forward Plan FY1979-83 HSA/OPEL, May 1977.

The Health Underserved Rural Areas (HURA) program is a project grant program for rural health research and demonstration which represents one component of the Office of Rural Health, BCHS. Originally funded under Section 1110 of the Social Security Act, the purpose of the program is to develop projects which will provide alternative modes of care to the population in one or more of the qualifying areas: Medically Underserved Areas (MUAs), Health Manpower Shortage Areas (HMSAs), High Migrant Impact Areas (HMIAs), High Impact Areas (HIAs) and High Impact Mortality Areas (HIMAs). Of the 2485 counties in the United States and Territories not designated as Standard Metropolitan Statistical Areas (non-SMSAs, i.e., contiguous population areas having fewer than 50,000 people and a major center), 2142 meet one or more of the criteria indicating a need for additional health services.

The HURA program is founded on the assumption that efficient resource allocation and management will lead to improved patient outcome and reduced costs. The program goals are therefore couched in terms of process rather than outcomes.

HURA project grants are available to nonprofit groups to cover the operating costs of community health clinics, satellite clinics, and other health projects in these underserved rural areas. All of the projects provide physicians' services augmented by those of physician extenders. Since the program's inception in 1975, it has grown from nine projects involving $3.3 million to 88 grants in FY77 involving $14.6 million.

The Community Health Center (CHC) program, originating with OEO, subsequently expanded under Section 314(e) of the Public Health Service Act and currently authorized under Section 330, supports ambulatory health care projects. Through the Urban Health Initiative and the Rural Health Initiative, the program provides primary care to medically underserved populations in both urban and rural areas. Predicated on total family care incorporating sound preventive health measures, projects are of two types: The Family Health Center offers a range of services on a sliding-scale, prepaid capitation basis, and the Community Health Center is concerned with integrating health and social services for comprehensive family care. Of the 442 CHC projects funded, 251 are to CHCs in exclusively rural areas and 44 are to rural migrant projects.

The FHCs might be seen as representing rural communities' share of the Health Maintenance Organization (HMO) enthusiasm. Because most rural areas lacked the population base to market a full HMO, a compromise program was proposed which would offer support for a system of prepaid ambulatory care for small populations. When this special program was brought into the larger community health center concept (along with the NHCs begun under OEO), the FHCs had the option to remain FHCs and operate as prepaid programs or become CHCs and work from a more feasible line-item budget.

The Rural Health Initiative (RHI) serves as both umbrella and adhesive for several of the rural health programs previously discussed. RHI funds support projects based in other Public Health Service (PHS) programs and while much of the activity is still in the developmental stages, there is considerable integration between RHI and other PHS programs. For example, 94 of the 191 projects have approval for NHSC staffing. Referral and consultation relationships with Community Mental Health Centers have been or are in the process of being developed in 82 projects. There are linkages with the BCHS-administered programs of Migrant Health and Appalachian Health. There are also ties to the Area Health Education Center projects of HRA, the Drug Abuse Program of the Alcohol, Drug & Mental Health Administration, Cervical Cytology Clinics and Breast Cancer Detection supported by the National Institutes of Health and the food supplement program for women, infants and children of the Department of Agriculture.

The National Health Service Corps was the first major program to direct federal assistance at placing health personnel in rural communities rather than supporting delivery programs. Established by the Emergency Health Personnel Act of 1970 (P.L. 91-623), it is designed specifically for Critical Health Manpower Shortage Areas. The Corps recruits health professionals to serve in these areas for at least two years with the ultimate goal of their remaining in the areas to establish private practices. The Corps agrees to provide the community with health manpower as well as administrative and financial management assistance. The community agrees to manage the NHSC practice, provide an office, supplies and staff support, and is responsible for purchasing, billing and collecting fees.

The Corps also decides which communities are health manpower shortage areas and provides these with technical assistance in developing applications, intensifying recruitment efforts and becoming self-sufficient community health systems. At the end of FY 76, 645 communities had been approved for Corps assistance and a total of 600 assignees (405 physicians, 93 dentists, 102 physician extenders) were serving 574,000 people in 331 communities.

The Appalachian Health program places major emphasis on developing at the local level the capacity to deliver adequate health services in the Appalachian Region. This area, which covers portions of thirteen states, is characterized by economic underdevelopment and high levels of poverty with most of the concomitant health deficits.

Although the 232 active grants under this program support activities as diverse as hospital construction, sanitary landfills, medical residency programs and halfway houses for alcoholics, the majority of grants support programs to establish, improve or systematize the delivery of primary health care services. Most of the 73 primary care projects (many of which have multiple delivery sites) are in medically underserved rural communities and reach approximately one million persons each year. Appalachian Health demonstration projects have pioneered the use of NPs and PAs in physician supervised teams and the linkage of individual primary care centers with systems providing secondary and tertiary levels of care.

The Emergency Medical Services (EMS) program is designed to provide assistance and encouragement to communities in 300 contiguous geographic regions of the country for developing comprehensive regionalized emergency medical systems, and thereby to improve the quality of patient care and reduce morbidity and mortality.

Established under the Emergency Medical Services Systems Act of 1973 (P.L. 93-154) and its Amendments of 1974 (P.L. 94-573), the EMS program administers grants for the development of regionalized emergency medical services. When completed, an EMS system must fill fifteen requirements among which are trained personnel, a communication and transportation network, critical care units, consumer participation, disaster linkages and mutual aid agreements. In addition, the EMS program provides technical assistance through national symposia, regional

workshops , onsite visits and a national clearinghouse for informational materials.

In the sphere of rural health, the distribution of scarce resources across large expanses and the concomitant threat of isolation seem to cry out for an emergency medical network. The bitter fact is that many rural areas have a high rate of accidents but only a skeletal emergency system. There is a large number of work-related accidents in the rural occupations of farming, mining and logging. The survival rate of auto accident victims is lower in rural areas than in metropolitan areas and many acutely ill and elderly persons die in rural areas because care is physically inaccessible.

The federal impetus toward categorization of emergency medical services has the potential of affecting rural health services in a variety of ways. No matter what the details of the scheme that eventually prevails, the basic intent of categorization is to maximize the productivity of high-cost facilities, personnel and equipment by regionalizing their distribution so that within a given geographic area the level of resources available to handle a given emergency case is matched to the criticality of that case. This means there is a tendency to concentrate the most sophisticated and expensive resources in a central location within a region, with outlying areas supplied to the lesser degree necessary to care for the larger yet less critically ill patient care load.

The potential effects upon the outlying facilities themselves, and upon the costs, effectiveness and availability of care are enormous and extend well beyond "emergency" care alone. For example, hospital admissions often depend heavily on use of the emergency department. How a reduction in the severity of the caseload handled by the community general hospital's emergency department will affect the economy is not yet known. Moreover, there is evidence to suggest that hospital emergency rooms are increasingly the major providers of ambulatory care to rural populations. (Webb 1977)

Categorization will certainly also have an effect on certificate-of-need decisions by planning agencies. An individual decision as to where to approve a CAT scanner or an expanded critical care unit will most probably take into account the current status of categorization in

emergency care. Prior decisions of this sort will influence subsequent ones, and these in turn will affect the distribution of physician specialists and other personnel.

Rural America will not be able to afford the enormous sophistication and expense of the type of modern EMS system which now operates in many metropolitan areas except at the sacrifice of other essential services, unless ways can be found to reduce its cost or increase its productivity. One alternative is to find ways in which emergency personnel and resources can be used in these areas to provide other needed services without interfering with their emergency functions.

The question of the most efficient means of transportation--of patients and providers--has been the subject of study for many years. A number of studies have been conducted on the cost-effectiveness of helicopters or fixed wing aircraft in providing emergency rural health care. (Cowley et al. 1973, Jacobs and McLaughlin 1967, Neumann et al. 1973) Several reports have examined the best patterns of rural ambulance service at both current and optimal levels. (Perrine and Hall 1972, Volz 1971, Waller et al. 1966)

Although many plans have been written for Emergency Medical Services in rural areas,* there is a relative paucity of actual research data. Several states have attempted to redress this situation by using Title V funds to gather information on their EMS systems and to develop, improve or expand them. (McIntyre and Madden 1977) In some cases the analysts used location analysis in drawing up these plans. With computer programs they are able to identify the most efficient locations for various services in order to minimize travel distances and maximize time accessibility for the population to be served.

The MITRE Corporation has proposed an EMS system evaluation model capable of measuring EMS system effectiveness quantitatively, based upon patient outcome. The results can be used to present a baseline picture of an existing EMS system and to predict the impact of certain innovations

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*See the compilation by Plass, et al.: *The Evaluation of Policy-Related Research in Emergency Medical Services*, Vol.I, A Selected and Critical Annotated Bibliography, University of Tennessee, Bureau of Public Administration, 1974.

on EMS system effectiveness. (Neham et al. 1976) In addition The MITRE Corporation is currently exploring the feasibility of producing a primary medical care analysis and evaluation methodology which integrates component ambulatory and EMS subsystem models. These analysts believe that a method can be developed of accounting for the effects of one subsystem on the performance of another. This would have obvious implications for improving rural health care delivery.

Similar problems plague other aspects of rural health care delivery as well. Technological solutions to the problem of inadequate access have been proposed. There are mixed reports on the effectiveness of mobile health vans in delivering care in rural areas. (Bodenheimer 1974, Perry 1976) Just as the urban physician has abandoned the house call in favor of the emergency room, some rural planners view these patient transportation systems as the preferable alternative to mobile clinics. Others argue that outreach efforts are the only way to improve health care utilization of recalcitrant populations. (Salber et al. 1976)

Summary

The issue of access requires careful specification of the frame of reference and delineation of the areas to be included. A number of pressing questions remain to be answered by researchers and policymakers:

Accessibility

1. How should accessibility to rural health services be defined? What are the dimensions of accessibility? Which dimensions of accessibility are desirable and affordable in rural areas?

2. What are the standards for accessibility that are applicable to rural areas for primary, secondary, and tertiary services? What aggregation of service areas is most appropriate?

3. To what extent are the standards of accessibility generalizable across socioeconomic, cultural, and locational subgroups within rural areas?

4. What are the barriers to access in rural areas? What is the relative importance of these barriers?

5. What is the relationship between increased availability to health services in rural areas and the utilization of services?

6. What is the relationship between changes in the accessibility of medical care for rural populations and changes in health status?

7. What is the relationship between the accessibility of health services in rural areas and the quality of the services provided?

8. How does increased accessibility affect cost of health services in rural areas?

9. How does personnel turnover (e.g. at NHSC sites) affect utilization--both short-term and long-term?

10. How comparable are various rural health programs in terms of population to be served and the availability of community resources?

11. What has been the relative effectiveness of rural health programs (i.e. HURA, RHI, NHSC) in increasing the accessibility of health services in rural areas?

Coordination

12. What types of coordination arrangements provide increased accessibility to health services in rural areas? Among facilities and services within a given rural area? Among services within the rural area and primary, secondary, and tertiary resources outside of the rural area?

13. How can communities be classified to best implement alternative coordination strategies?

14. What are the desirable and realistic goals for a rural health program? What are appropriate criteria for measuring the success of rural health programs?

15. What are the characteristics of health services programs in rural areas, including scope of services, financial viability, and satisfaction of providers with the quality of their practice life?

16. To what extent is the success of a project a reflection of community characteristics? Can the effects of community characteristics be separated from program effects?

17. Is success in non-health related efforts in a rural area indicative of potential success in the development of rural health services?

III. HEALTH PERSONNEL

No western democracy has found a solution to the common problem of health personnel distribution. If one were to invent a coat of arms for rural health personnel, it would likely be a barren shield with a few thinly scattered dots emblazoned with the words "Recruit and Retain."

Much of rural health care's history is tied to the problems of personnel and they in turn course through issues of access, utilization and financing. Over the years a variety of strategies directed to improve distribution of health personnel have been advocated and some have been implemented.* But despite all of these efforts, the picture which emerges of the health personnel scene in rural America is not very clear. The few principles which do appear to hold true with some degree of consistency are not likely to raise expectations for an easy solution:

(1) The providers most apt to locate in rural areas are family physicians and physician extenders. A number of descriptive data sets suggest that physician extenders (especially physician assistants and MEDEX) are most likely to work in rural areas. (Lawrence et al., 1975, Morris and Smith, 1977, Perry, 1977) Among physicians, family and general practitioners are significantly more likely to enter rural practice than are specialists. In fact, in 1973 rural communities had more general practitioners per capita than did urban areas (2.7/10,000 compared with 2.3/10,000). The difference in overall physician supply lies, however, in the distribution of

*For an annotated bibliography of recent publications pertaining to the distribution of health personnel, factors influencing locations of practitioners and incentive programs designed to influence health professionals to practice in underserved rural and inner city areas, see Sax, Ellen and Unterman, Barbara (Eds). *Distribution of Health Personnel:* An annotated Bibliography. New York National Health Council, 1976.

specialists (0.9/10,000 in rural areas compared with 14.9/10,000 in the metropolitan areas). In contrast, when all physicians are considered as a group, the number of MDs in non-metropolitan areas is 6.7/10,000 and in metropolitan areas 15.2/10,000--a difference of 127 percent. The distribution pattern of foreign medical graduates (FMGs) is less easily identified. (Butter and Schaffner, 1971) Overall statistics seem to indicate that they disperse in much the same way as US medical graduates, but some case reports have indicated that they are more likely to locate in poverty areas, including rural areas. (Lowin, 1975) Osteopathic physicians, like their MD counterparts, tend to practice in metropolitan areas: In 1974, only 17 percent of all DOs were located in counties with 50,000 or fewer inhabitants.

(2) The communities with least resources will have the greatest difficulty attracting providers. There is a clear trend at both the macro and micro levels to suggest that the communities with greater assets (both financial and social) are more successful in recruiting and retaining physicians. (Kane et al., 1975) That is to say, a less remote rural area having a higher population density, stronger economic base and better third party coverage is less likely to be threatened with a health personnel shortage.

(3) The clamor for a physician does not always mean (s)he will be utilized. Communities which seem desperate to get a physician may choose not to utilize his/her services once (s)he arrives. The reasons for this phenomenon are not clear. It may be a function of sponsorship. It may be that citizens are reluctant to break previously established links to alternate health care services, or that they are reticent to establish bonds with personnel they perceive as transient.

(4) The factors that may make a practice more attractive to a physician are likely to create inefficiencies. There are difficult choices to be made in the subsidization of rural

health personnel. Prior experience has shown that the pressures for financial self-sufficiency conflict directly with the expressed needs of the provider; for example, health personnel like the professional support of working in groups, even though this organizational form may be less productive for each of them and economically less sound for the group.

Through the years a number of different approaches to the problem of maldistributed health personnel have been advocated. These might be summarized as selection, seduction, stimulation, specialization, satellites, substitution and symbiosis.

There is a fairly substantial body of data to suggest that lifestyle preference is an important criterion in a provider's choice of practice location. Moreover, those individuals who were raised in a rural environment (and particularly if their spouse also comes from a rural environment) are more likely to want a rural practice. (Taylor et al., 1973, Yett and Sloan, 1974, Coleman, 1976) Operating on this premise, one program which selectively admitted such students to medical school reported a high rate of return to rural areas. (Mattson, 1973)

Research on lifestyle preference suggests that it is better to invest in the careful selection of students to medical school who have characteristics associated with later choices for rural practice than to hope to influence attitudes once the student has matriculated. (Mattson et al., 1973, Taylor et al., 1973, Liccione and McAllister, 1974, Cooper and Heald, 1977, Coleman, 1976)

Professional considerations which also figure prominently in a physician's choice of practice locations include the availability of clinical and/or hospital facilities, the opportunity for contact with other physicians and the possibility of continuing education. (Taylor et al., 1973, Champion and Olsen, 1971, Parker and Sorenson, 1978, Coleman, 1976, Pollitt, 1977, Ducker, 1977) One recent retrospective survey of 1971 medical school graduates shows that rural physicians were generally more influenced by the desire to live in a rural environment, the high medical need in an area and community recruitment efforts than were urban physicians. Furthermore, they were less

influenced by the opportunity for contact with other physicians. Foreign medical graduates more often expressed a concern for continuing medical education, high medical need in the area and income potential. (GAO, 1977)

Although loan forgiveness has been endorsed and abandoned with enthusiasm on several occasions in different settings, it continues to reemerge as a potential solution to the problem of health personnel maldistribution. Studies on the effectiveness of this purely economic incentive on a physician's recruitment and retention in manpower shortage areas generally agree it has not been too successful. Approximately one-third of all students buy out of their obligation and less than two-thirds remain in the shortage areas after their required period of service is completed. (Mason, 1971) Although the liberalization of the loan program in 1971 increased the number of participating students, recent surveys have shown that the program exerted little influence on their eventual practice location. As a matter of fact, most of the participants stated that even without the loan forgiveness program their location choice would have been the same. (GAO, 1977) The current debate on this topic centers around the argument that if a student accrues a sufficiently high debt, buying out becomes a less attractive alternative. The rising costs of medical education are seen as effectively producing a more conducive situation. As yet, however, there is no adequate data base to evaluate this most recent renovation of the proposal and the General Accounting Office sees little cause for optimism.

An alternate form of seduction is a type of indentured service: Scholarships are offered in exchange for paid service in the National Health Service Corps or other federal health care programs. Here again the high cost of medical education should make this alternative more attractive. Even for those without scholarships, the Corps sites offer new graduates a means of gaining practice experience with financial security.

The NHSC program has two basic goals: A short term goal to redress the imbalance of personnel resource distribution by placing providers in scarcity areas, and a longer term goal of encouraging

these providers to locate their practice in those areas permanently. Although the scholarship funding has jumped from $3.0 million in FY1974 to $40 million in FY1977 and the number of placements has risen accordingly, the program has as yet been unable to staff some sites in more remote and isolated communities. Furthermore, the trend in retention rate has been difficult to assess because of a redefinition several years ago to include reenlistment. The composite retention figure given for FY1976 was 38 percent.

A recent study examined thirty NHSC sites to isolate variables that would distinguish those sites which were never staffed, those which had no staffing problems and those which proceeded to become self-supporting. The most consistent factors were found to be measures of income and labor force. Independent sites had more physicians, more hospital beds and more hospital beds per capita. (Woolf, 1977) This study substantiates other research findings which indicate that economic factors have long been major forces in determining the location of physicians in general. (Fuchs and Kramer, 1973, de Vise, 1973)

The ability of a community to support a clinical facility is directly related to the utilization of that facility. Since a high proportion of the costs for a Corps site is fixed in terms of salaries and equipment, increasing revenues is the surest way to self-sufficiency. However, early analysis of Corps sites indicated that productivity was substantially lower than that of private practitioners and that costs per encounter were higher despite the lower salaries of Corps physicians. (Dobson, 1975) These findings have been substantiated by more recent data. (Heaton, 1977) Furthermore, the NHSC policy of authorizing two physicians to most sites in order to overcome the isolation endemic to shortage area practice and to ultimately increase the number of physicians remaining as private practitioners contributes to this productivity-cost dilemma. According to one recent study, this policy may facilitate recruitment and retention of health care providers but it "lowers the productivity of the NHSC physicians, increases the cost-per-encounter in the short run and will limit the ability of the sites to become self-supporting." (Emery et al., 1975)

Another analyst has attempted to identify the factors associated

with patient utilization of Corps sites by comparing groups at opposite ends of the continuum in terms of absolute numbers of patients seen per provider per year. The results indicate that the best predictors are economic factors of the community rather than specific provider behaviors. The communities with a better economic profile had a higher rate of utilization of NHSC clinics. The physician's commitment to the community, his plans to stay or involvement in local acitivites, made no significant difference in the degree of utilization. Moreover, the extent of community backing in starting the clinic was not predictive of its utilization; in fact, more of the high utilization clinics had received support from outside the community. (Nighswander, 1977)

Another study of a small number of northwestern Corps sites suggests that multiple provider sites with ready access to a hospital have a greater chance of reaching the utilization threshold necessary for financial viability but will still require at least two years to do so. (Rosenblatt and Moscovice, 1978)

Collectively, these studies question the expedience of expecting these clinics to become self-sufficient in a short period. It appears that in many communities, the clamor for a resident physician is not matched by enthusiastic use of that resource. Where a pattern of health care utilization has been established outside the community, it is difficult to alter it quickly. But without such rapid shifts in loyalty, the government-sponsored physicians may become discouraged and move on after fulfilling their limited obligation.

The implications are disquieting. Making more critical assessment of placement areas and basing the decisions on a significant probability of high utilization rates would eliminate the poor, sparsely populated areas with few current resources. Meeting the health care needs of these areas may require finding an alternative source of manpower.

If the goal is to increase the supply of physicians to rural areas, the current emphasis on producing primary care physicians appears reasonable. The available data are somewhat confusing, however. It is true that a primary care specialist is more likely to settle in a rural area than is a subspecialist. The question, though, is whether

location preference determines the specialty choice, or the reverse. Hassinger et al. suggest that for most physicians, location decisions are made prior to training and may influence the choice of specialty. At the same time, comparing changes between 1961 and 1975 among a group of rural and urban practitioners, they note that the model of rural practice is coming to resemble the urban model with more comparable work loads. (Hassinger et al., 1978)

Another technique for increasing the number of rural physicians is experiencing a renaissance. Despite earlier reports that preceptorships did not significantly stimulate increased interest in rural practice, (Steinwald and Steinwald, 1975, Coleman, 1976, GAO, 1977) the concept has been revitalized as a potential mechanism to recruit physicians. There are some indications that these apprentices are more likely to enter primary care specialties; some program advocates suggest it should, therefore, be viewed primarily as a means of influencing medical students to enter these specialties and only secondarily as a way of improving rural physician distribution. Unfortunately, interpretations of the data have been plagued by the problems of self-selection. A large study of both voluntary and required rural health experiences currently being conducted under the sponsorship of the Bureau of Health Manpower (BHM) should resolve the current quandary about the effects of such preceptorships. The BHM has also commissioned a followup study of NHSC alumni to assess that program's effectiveness in stimulating a continuing interest in rural health care practice.

One means of sustaining rural practices may lie in forging adequate linkages with urban resource centers. The Area Health Education Center represents one form of satellite wherein education has been decentralized to achieve several goals simultaneously: Various levels of rural health manpower can be trained closer to their homes with less inconvenience and at lower opportunity costs; urban manpower can be exposed to rural practice; and rural providers can be linked to urban teaching programs. Although it is still too early to assess the program on the basis of eleven sites in operation, one study suggests they may be successful in attracting more primary care specialists

other than general practitioners to rural practice. (Coleman, 1976) The program would meet the continuing education and clinical support needs listed by many medical students as requisite to their practice location choices. But another report strongly suggests that their ultimate success will be closely tied to the strength of general program support from state and local agencies. (GAO, 1977) This dependence on outside support could mean, however, that the programs will exclude bordering areas in other states.

One approach to the rural health manpower problem which has been intensively studied during the past ten years is the use of physician extenders. (Kane and Wilson, 1977, Report of PE Workshop, 1978, Bliss and Cohen, 1977) These physicians assistants (PAs), MEDEX and nurse practitioners, representing varied backgrounds and training, have been promoted as both physician supplements and physician surrogates. PAs receive about two years' training in primary medical care after several years' experience in generally health-related fields. MEDEX are individuals such as former military corpsmen who have extensive health experience prior to entering the year of training in primary care, training which is usually under the preceptorship of the employing physician. Nurse practitioners are nurses who receive up to two years' further education in subjects related to primary medical and nursing care.

These new health practitioners have for many years been performing a wide variety of tasks both independently and under the supervision of a physician. (Dobmeyer, 1975, Taller, 1974) They have been found effective providers of special services in chronic care, geriatrics (Kane et al., 1974) and in preventive screening services that may be inefficient uses of a physician's time. (McCormack, 1972, McFarlane, 1972) Available data suggest that most PAs work in primary care practices and have located to a disproportionately higher degree than MDs in rural areas. (Lawrence et al., 1975, Morris and Smith, 1977, Perry, 1977)

Perhaps the best-known nurse practitioner program is the Frontier Nursing Service in the Appalachian region of southeastern Kentucky. Family nurses and midwives form the core of the health care delivery

system in this remote area with a few physicians and other support personnel as backup. Although this outpost system of primary care delivery has proven highly effective through the years, (Isaacs, 1973, Moscovice, 1977, Kirk, 1971) it too is faced with the problem of financial self-sufficiency. (GAO, 1977) A more recent example of the effective utilization of family nurse practitioners in a remote setting is that found in rural Newfoundland. (Chambers et al., 1977)

Almost every report on the quality of care delivered by PEs suggests that it is generally at least equivalent to that provided by the supervising physician. (Spitzer et al., 1974, Kane et al., 1976b, Duttera and Harlan, 1978) In addition there is increasing evidence to suggest that the environment in which the care is rendered may be an important factor in its quality, tone and patient acceptance. (Moscovice, 1978, Nelson et al., 1974, Breslau, 1977, Simborg et al., 1978) The site of care may determine its style; providers working in one setting may perform more like others in the same setting than like themselves in a different setting.

The effects PEs have on practice productivity are less clear, however. Several studies suggest that they are more than able to offset their costs by increases in practice volume. (Lees, 1973, Spitzer et al., 1974, Olsen et al., 1978, Golladay et al., 1973, Smith et al., 1971, Golladay et al., 1976, Nelson et al., 1975, Chambers et al., 1977, Record et al., 1976) A few reports present a more mixed picture. (Kane et al., 1978a, Heaton et al., 1977) Furthermore, although there is general enthusiasm for the concept of remote site practices manned by PEs (GAO, 1977, Chambers et al., 1977, Blake, 1978, Isaacs, 1973, Kirk, 1971), there have been reports of instances where they have not been successful. (Greenwood et al., 1976)

There is a growing sense that physicians are becoming more supportive of using PEs; (Perry, 1977, Lawrence et al., 1977, Borland et al., 1972) and with physician support, patients appear willing to accept care from PEs. (Nelson et al., 1974) However, there are some indications that PE care may be distributed more among the disadvantaged than among affluent patients (Rushing and Miles, 1977) and that more affluent patients are less willing to accept PEs. (Breslau, 1977)

Several researchers believe that the use of physician extenders will greatly contribute to correcting the maldistribution of primary care services. (Perry, 1977) Others feel it may help to keep physicians in rural areas (Lawrence et al., 1975) and may even improve the performance of many physicians by placing them in the role of teachers and causing them to reassess their habitual methods of care. (Kane et al., 1976C)

A concept that overlaps with some of those previously described is the use of health care teams to deliver primary care. Rural areas, it is argued, could benefit greatly from assorted combinations of personnel-physicians, physician extenders, nurses, dentists, social workers. Although very little evaluative data are available to assess the overall success of such teams (R.A.Kane, 1975) there are a great number of recent reports of their operation. (Wise et al., 1974, Eichhorn, 1973, Eichenberger and Gloor, 1969) These reports suggest that team care will require a substantial investment of effort to maintain itself, and at this point it is unclear whether it is possible to field a rural health team that will satisfy both providers and patients and still be reasonably efficient.

One bridge across the gap between PEs' functioning independently and onsite physician supervision lies in the use of communications technology. The most commonly used communication tool remains the telephone. Unfortunately there are several problems with the current use of this method, including the lack of adequate recordkeeping, the question of who is to pay for the call if it involves an extra charge, and the fact that it is not always a satisfactory way of making a diagnosis and prescribing a therapeutic regimen. (Perrin and Goodman, 1978, Katz et al., 1978) Nevertheless, the marginal benefit of more elaborate technology has not been clearly established. One study comparing television and telephone consultations found that although television consultations took longer, the patients handled in this way required fewer immediate referrals to hospitals. (Moore et al., 1975) Another found no improvement in using more complex technologies over the telephone. (Dunn et al., 1977) Television has also proved an effective link between remote sites manned by physician extenders

and the primary care center. (Murphy and Bird, 1974) Despite its cost, two-way interactive television does have its advocates. (Bashshur and Armstrong, 1976) However, most of the pilot operations have been conducted in urban areas.

Some work on communication technology has been carried out in very remote settings such as the use of orbiting satellites to enhance radio linkages between village health workers and health centers (Feiner, 1974, Hudson and Parker, 1973) and the application of astronaut monitoring capabilities to mobile vans. (Rockoff, 1977 a)

Much of the work, however, has been directed at more conventional settings. (Rockoff, 1977 b) For example, analysts at The MITRE Corporation have spent several years examining the communication needs of rural primary care systems. They have identified some basic configurations of service around a dominant plan of satellite clinics staffed by PEs. They have gone on to develop simulation models based on the concept of a patient trajectory--i.e., the extent to which augmented communication can be used to obviate the need for a face-to-face encounter with the supervising/consultant physician with no significant decrement in the quality of care provided. The preferable mode of communication technology is thus determined by comparing the cost of establishing, operating and maintaining the technological system to the savings primarily in terms of travel time and expense, both for provider and patient. (Rockoff and Bennett, 1977, Doermann et al., 1975 a&b, Anderson and Walcoff, 1976)

For most rural situations, the systems which utilize narrow band communications (i.e., single channel telephone lines) regularly emerge as the most efficient. This form of communication precludes two-way interactive television but does permit voice communication and slow-scan fixed image television and electronic monitoring of such tests as electrocardiograms. (Bennett, 1974, Walcoff et al., 1975) Although these technologies have been extensively simulated and an evaluation model has been developed, they are operational in only a few sites and their evaluation is minimal. One problem in wide scale adoption is the presence of over 1000 different telephone companies serving rural America with potentially incompatible equipment. (Rockoff, 1977 a)

The other form of communication technology with great promise for rural medicine is the computer. Considerable effort has already gone into adapting computer technology to medicine. Computer use in the field seems a likely means of providing more reliable decisionmaking, data retrieving and a way of remotely supervising the care provided by PEs. (Sox et al., 1973) However, while the future of medicine seems inexorably tied to the computer, only a small number of rural sites are currently taking advantage of this technology. (Anderson and Rappaport, 1977)

Summary

Many opportunities appear in the offing for creative use of health personnel in rural areas but many pressing questions are still in need of answers:

Identification of Personnel Needs

1. Is the capability of a rural health care delivery system better assessed in terms of personnel supply or service capacity? What are the limitations of each?

2. What is the most useful geographic unit for assessing the scarcity of health personnel?

3. What are alternative approaches to measure the concepts of "medical underservice" and "shortage" in rural areas? What is the validity of each?

4. How is the demand for health services in rural areas measured and translated into estimates of personnel requirements?

5. What is the relationship between changes in the supply of health personnel and changes in the health status of rural populations?

6, Should more attention be paid to the need for personnel to care for at-risk groups, e.g., geriatrics, pediatrics?

Training, Recruitment, and Retention

7. What background characteristics of potential health service program students increase their probability of selecting rural practice?

8. What experiences in medical school training programs increase the probability of rural practice selection?

9. What is the relative importance of factors (professional, sociodemographic, personal, etc.) that influence the retention of health providers in rural areas? How does the importance of the factors vary by physician specialty and between physician and non-physician providers?

10. What is the importance of economic incentives in the selection of practice location for physician and non-physician providers? How effective are such incentives as loan forgiveness and practice relocation loan programs?

11. How do community structural factors influence recruitment and retention of physicians and non-physician providers?

12. Would more training in practical problems of practice organization and management help young physicians make the transition to rural practice?

Organization

13. What forms of practice organization promote provider self-sufficiency and are able to attract and retain health personnel in rural areas?

14. What effects do specialized rural health personnel programs have on the retention of physician and non-physician providers?

15. What is the relative effect of environment vs training on the practices of physician and non-physician providers? How do practice characteristics vary with the remoteness of the practice location?

16. What are the legal barriers to attracting and retaining non-physician providers, particularly physician assistants? How will the Rural Health Clinics Services Bill affect the development and deployment of non-physician providers?

17. What is the limit of substitutability of non-physician providers for physicians in rural areas?

18. How does the use of specialized technology affect the deployment of physician and non-physician providers in rural areas? Does increased availability of technology, particularly communications, improve the probability of physician retention?

IV. FINANCING

Rural areas are particularly vulnerable to the national schizophrenia to improve access to and increase the scope of health care services, while at the same time striving to control the cost of care. A critical question here is the extent to which greater efficiency can produce the funds to invest in more innovative health care efforts, or alternatively whether investing in certain areas might yield offsetting savings in others.

Although a great deal of work has been done on resource allocation, there has been very little on financing. Several major studies are currently underway, but so far most of the available studies relate to reimbursement evaluation and the investigation of viable patterns of rural primary care practices. The difficulties are compounded by the fact that although the Bureau of the Budget compiles copious materials on federal health care financing, it offers no urban/rural breakdown of the figures. This omission impedes effective analysis and evaluation of rural health care financing issues, and leaves many questions unanswered.

One of the contemporary areas of debate is the extent to which we should invest more heavily in primary care and preventive services (McKeown 1976, Lalonde 1974, Breslow and Somers 1977) Some areas of rural America remain in an underdeveloped state and can benefit greatly from traditional public health programs in nutrition and sanitation. More affluent rural communities however share the national ambivalence on this question. Moreover, it is still not known whether investments in better primary care will result in reductions in hospitalization costs. Reviews of the OEO-financed War on Poverty era of the 1960's tend to be more optimistic about the financial benefits of comprehensive care (Gross 1972, Sparer and Anderson 1973, Klein et al. 1973, Perrott 1971) than are more recent ones (Chassin 1977). Many of the attempts to contain costs appear to focus on administrative policies and various incentives such as capitation which are designed to minimize hospital use.

There are a few recent studies which provide direct measures of how increasing primary care services in rural settings affect hospital utilization rates. When nurse practitioners were made available to a rural

Newfoundland community, for example, the number of primary care visits increased and the number of acute hospital days fell among its residents. At the same time, acute hospital days increased in the control area. Although the total number of hospital admissions decreased in both areas, the decrease was greater in the NP-served community. (Chambers et al. 1977) In a rural southern community, however, the addition of physician assistants also prompted a rise in primary care utilization, but the hospitalization rate increased as well. (Miles and Rushing 1976)

A basic problem with the use of PAs and NPs has been the failure of Medicaid and Medicare to acknowledge them as providers and to reimburse them directly for their services. There are studies of the use of such personnel as adjuncts to private practice physicians which indicate that they can usually generate sufficient revenue to at least offset their costs (see p. 32 in the health personnel section). The recent passage of the Rural Health Clinic Services Bill (P.L. 95-210) will help to rectify the problem with federal payment programs. Authorizing direct payment to PAs and NPs on the staff of approved rural clinics, it also provides coverage for a rather wide range of services including home health; there is some hope that there may be experimentation with broader coverage for preventive and outreach services not usually covered by these programs.

Nevertheless, the law leaves some unanswered questions. State agency approval is required, for example, in order for a clinic to become certified. Will different standards be applied to PE-staffed clinics than to MD-staffed facilities? Many states currently do not certify the latter. To what extent are PEs to be paid for equal services? A cost-reimbursement approach suggests differential rates based on wage scales. How will cost-reimbursement influence productivity? What is to be done about uniform licensure? It is clear that the utilization of PAs and NPs will be greatly influenced by varying state laws and regulations. A recent analysis of these controls suggests that the full impact of PL 95-210 will be dampened unless legislative and regulatory changes are made. (Miller and Byrne 1977) Some of the highlights from that study are summarized in Table 5 but it cannot capture the wide variation which exists from state to state. Moreover, some states have been operating on the basis of tacit agreements without any formal policy or regulations.

Table 5: Highlights of State Rules and Regulations Regulating PAs and NPs.*

	Number of states with legislation or regulations	
	for NPs	for PAs
Reimburse under Medicaid	26**	28**
(same fee as MD)	18**	20**
Prohibiting prescribing drugs	8	18
Permitting*** prescribing drugs	8	9
Prohibiting dispensing drugs		4
Permitting dispensing drugs	2	3

*These numbers represent summary values; there are a variety of different conditions from state to state.

**States without explicit policy included in the total.

***Generally under limitations (e.g., types of drugs, prerequisites).

Source: Miller and Byrne Inc. Review and Analysis of State Legislation and Reimbursement Practices of Physician's Assistants and Nurse Practitioners Final Report Contract Number HRA 230-77-0011 Task Order Number 1, 1977.

The new law will necessitate setting explicit guidelines.

The Rural Health Clinic Services Bill does present an opportunity to gather useful data about the cost-effectiveness of PE-staffed rural clinics and, through special demonstrations, about the value of supporting preventive and outreach services. Because the law was intended to test various financing modes including capitation, alternative payment mechanisms should be tried and evaluated. The intention to pay for services on a cost basis raises several fundamental issues. The regulations indicate that services "incident to" a PA or NP service will be covered, but not how much of these support services can be justified. The bill covers the cost of physician supervision, but does not specify a limit on this cost, although it does set a minimum of one visit to the clinic every two weeks. If these remote sites are to be tied into a network of more sophisticated back-up services, how should the costs of supporting this linkage be defrayed? For example, should communications costs (from simple telephone calls to two-way interactive television) be charged against individual visits or be carried as basic overhead? Who should bear the costs of transporting patients to the necessary level of care (or conversely the cost of transporting a physician to see the patient on-site)? These concerns take on added significance in light of the fact that the Bill will pay for only that portion of care supported by Medicare and Medicaid. A clinic might develop an extensive set of support services and find that only a relatively small proportion of them were covered. Moreover, there is an important difference between counting such support as overhead or attributing it to a particular patient encounter.

In this period of rapid implementation of the Rural Health Services Clinic Bill there will likely be a strong effort to create as much uniformity of enforcement as possible. This drive toward homogeneity is understandable as an administrative necessity; it will, however, deprive the researcher of a requisite opportunity to examine the effects of different approaches. There is a great need to experiment in this area where so much is unknown. The Bill offers that opportunity; it can only be hoped that researchers are allowed the flexibility.

To the litany of unanswered questions in the financing of rural health care can be added concerns about the role of the small under-utilized hospitals which dot the rural landscape like structural chicken-pox. Relatively little is known about the way these facilities are managed, but anecdotal evidence suggests that some of the rules governing the efficient operation of larger, urban hospitals may not be applicable in these rural settings. Rural hospitals it has been shown, have high variable costs (Arthur D. Little, Inc. 1977, Cook and Atkinson 1977). One possible way of reducing the high fixed cost of unoccupied beds is to make staffing patterns more flexible, a practice which is more possible in rural communities where personnel are more willing to work only as they are needed.

Despite the furor surrounding the potentially adverse impact of recently proposed health planning guidelines, one recent study is optimistic about the rural hospital's relative invulnerability to external forces such as prospective rate setting, certificate of need and unionization. The close relationship of the hospital and the community is at once an asset for political support and a liability when change is necessary for survival. (Johnson 1978) Another suggests that the future of rural hospitals lies in their responding to opportunities for shared services. These multi-institutional arrangements could include affiliation agreements, corporate mergers (consortia) or simple purchase of specific services. (Wegmiller 1978) Hospital education programs too may be greatly strengthened through consortia. (Skaling 1978)

A set of Medicare demonstration projects has been developed recently to provide another dimension of flexibility in operating a rural hospital. Patients who no longer require hospital care but still need skilled nursing services can remain in the same bed and simply be reclassified. When this occurs, the hospital begins to receive skilled nursing home rates for the patient. This is an appealing innovation for rural areas where accessible nursing home beds are scarce and where unoccupied hospital beds could be filled without the necessity of permanently reclassifying them. The Health Care Financing Administration contract evaluation of this project now affecting Utah, Texas, South Dakota and Iowa, will be of great interest to those searching for

creative ways to utilize and thus maintain the small rural hospital. (HCFA 1977 and DHEW Evaluation 1977)

In some areas the problem of financing hospital survival is determined by the community's ability to attract physicians who will stimulate utilization of local facilities. An influx of younger physicians may lead to increased use of the hospital; or, conversely, an exodus can quickly lower utilization.

A Utah-based organization, Health Systems Research Institute, has developed a program by which they contract with a community to provide physician and allied health professionals services (as well as management services, if desired) in return for a specified sum. It is, in essence, a NHSC for more affluent rural areas. The HSRI reports success in getting community support once the local leaders learn that each physician will generate an estimated $200,000 in hospital charges, $50,000 in pharmacy charges and $120,000 in office fees each year. Thus a local practice not only keeps a significant amount of money in the community but also attracts substantial third-party payments for the hospital. (Kane 1977) This appeal to the economic self-interest of local business leaders may have significant implications for involving rural areas in their health care systems.

A study from the University of Utah used data from the National Center for Health Statistics' Health Interview Survey to predict actual utilization of rural communities. Using age-sex corrected data and the percent of births occurring in the mother's county of residence they were able to predict observed utilization with great accuracy ($r^2 = .96$). This prediction method was then compared to actual utilization of NHSC clinics and a similar set of rural clinics operated by the Health Services Research Institute. The productivity of HSRI clinicians was much higher than that of the Corps physicians. Moreover, the Corps practices tended to demonstrate a very homogeneous distribution of utilization which was not proportional to the number of providers in the clinic or related to measures of community support. The difference in productivity between the NHSC and HSRI is particularly striking since both groups are fully salaried with no direct incentives for increased work. (Div. of Community Medicine)

This study, together with the report on NHSC practices by Rosenblatt

and Moscovice, raises concern about the ability of NHSC sites to demonstrate the productivity necessary for economic survival. A Geomet study of 15 RHI sites and 115 NHSC sites indicates that the sites were covering only about half their costs (58 percent for NHSC and 52 percent for RHI). (Heaton 1977) One suggested remedy is the use of some form of incentive payment to reward productivity; such a step would bring these salaried physicians closer to a fee-for-service model. As already noted, however, different organizational sponsorship is associated with higher levels of productivity in the absence of any such direct incentives. This mixed pattern is also supported by the experience of pre-paid group practice plans; many programs use different types of incentives to encourage certain behaviors but there are also programs that achieve high levels of physician productivity with no incentives.

A basic assumption of most rural health programs, regardless of the particular sponsorship, is that they will become self-sufficient. Frequently, requirements to reach this state within a specified period are part of the authorizing legislation. The term is usually interpreted as financial self-sufficiency, or a state in which revenues support expenses. Funding agencies like the idea because it promises an end to fiscal subsidies and economists favor it because it implies some level of consumer demand and the potential of market competition. BCHS' proposed definition of financial self-sufficiency found in their Basic Common Reporting Requirements uses the extent to which billings of a rural site offset costs, or alternatively the extent to which billings equal charges. Three basic conditions which affect the probability of achieving this goal are an efficient administration, adequate utilization and adequate collections.

It is not clear as yet the extent to which significant savings can be achieved through better management. The Robert Wood Johnson Foundation has funded a series of rural clinics with the clear stipulation that one precondition is the presence of a capable administration. The NHSC has deliberately provided its sites with various forms of technical assistance in order to upgrade their administrative practices. Unfortunately, little specific data are yet available to assess the impact of this factor.

The relationship between utilization rates and self-sufficiency, however, is critical. From the vantage point of a health care facility, where the patients come from is relatively unimportant; from the community perspective it is crucial. There is a vast difference between the impact of a facility that simply redirects previous utilization toward itself and one that provides new services or reaches previously unserved populations. The latter may require opening facilities in the areas which have been rejected by other providers often because they are viewed as offering an insufficient market for services. In this sense, financial self-sufficiency may be incompatible with increased access.

The method of payment may also influence the potential for self-sufficiency. Fee-for-service payments encourage provision of those services that are specifically covered and if the goal of solvency is pursued seriously it will impede the delivery of needed but uncovered services. Furthermore, Davis notes that both Medicaid and Medicare discriminate against rural communities by paying a lower fee for the same services when compared to urban areas where prevailing prices are higher. (Davis 1975, 1976b) The disparity between rural and urban practice is further enhanced by new developments in medical technology which become incorporated as accepted practice procedures. Whereas the new technological devices are generally more available in urban areas outside physicians' offices, in rural settings the individual practice may have to bear directly the cost of adding the service. (Davis 1976a)

Recognizing that the extent to which services are covered will directly affect the scope of services delivered, it is necessary to address the issue of what services to support. We have already noted that in some rural areas health may be strongly influenced by basic provision of food and sanitation, but these are not usually defined as medically reimbursible care despite their profound effect. A change in present policy has significant financial implications and there is a need for closer examination of the ways in which such potentially important services can be effectively incorporated into payment mechanisms.

Other important questions emerge about changes in the existing reimbursement mechanisms. Should reimbursement rates in rural areas be raised as an incentive to attract physicians? How can reimbursement mechanisms be used to reward increases in efficient delivery of services? Is it perhaps necessary to incorporate specific demographic, economic and environmental variables into reimbursement formulas to reflect the difficulties of practice in rural areas?

From the economist's perspective the question of getting health personnel in rural areas is one of price. At some level of remuneration physicians and other health care providers should be willing to forego the perceived benefits of urban life and migrate to rural areas, at least for a finite period. Although this market clearing price at which supply would equal demand may be high--perhaps two or three times the current price of urban physicians--economic theory strongly posits that a price does exist. It is important to appreciate that at present the price system works in just the opposite direction: As has been noted, rural physician services are paid at a much lower rate than comparable services in urban settings. The difference is sufficiently large that there is actually a reversal of transfer funds flowing from rural to urban areas. Once this occurs, the question arises of ultimate responsibility.

Left to a totally free market approach some communities may be willing and able to meet the price, especially if they can realize a return on their investment through increased use of a community-supported hospital, increased employment in health related services, and perhaps even in general economic growth. (Phillips et al. 1968) Many communities, however, will be unable to meet this price readily and may look to the several levels of government for subsidization. The issue quickly becomes one of how strongly we value equity and how willing we are to assume such liabilities. The lessons of Hill-Burton hospitals still loom large: Access to care came at a high price and the result was a scattering of small underutilized hospitals.

There may be less expensive solutions to the problem of getting health personnel in rural areas. It appears for example, that salary and support costs of mid-level health practitioners may be lower. Such a substitution begs the basic question, however, of the extent to which communities should be subsidized. This is less a research question than it is a policy issue.

A further issue related to the financial solvency of rural health care facilities is the problem of the medically indigent. Despite the availability of several federal and local programs to cover indigent care there remain segments of the population who can neither afford care nor obtain third-party coverage. This dilemma of unsubsidized medical indigency is particularly threatening to rural populations. (Lane 1976) For those persons with very limited cash incomes, deductible and co-payment insurance requirements may well inhibit its use. (Newhouse and Phelps 1976, Phelps and Newhouse 1974) The Health Insurance Study currently being conducted by The Rand Corporation includes two rural communities and the data will provide badly needed information on how various levels of co-payment affect utilization of health care services, and in turn how this difference in utilization affects health status. (Newhouse 1974)

The expectation of financial self-sufficiency of projects in primarily indigent areas requires that the burden of support can be transferred from project funds to other sources of payment to reimburse care given. Where these other sources are insufficient or where substantial portions of the population are not eligible for such support, the probability of self-sufficiency is nil. This exposes the fundamental paradox of demonstration grants: Although they are targeted to areas of need--often just the type of areas described, the requirements for self-sufficiency argue for siting projects only where the possibilities of maintenance funding are assured. Such action would leave many rural areas unserved.

The advent of some form of national health insurance (NHI) promises an answer to this problem, at least to the extent that coverage will be universal. But NHI raises other issues. If the current discrepancy between urban and rural funding levels is perpetuated under NHI, it will be even more difficult to attract providers in rural areas; the increased

support for urban care will provide additional opportunities in the cities. Similarly the small rural hospital will have difficulty meeting regulations designed for larger urban institutions. Moreover rural people with low cash incomes will probably make less use of services that require deductibles and co-insurance. (Newhouse, Phelps and Schwartz 1974)

Summary

The key to health care delivery in rural areas may well be inherent in the way services are financed. A number of vitally relevant questions await answers:

Reimbursement

1. At what levels of "cost" and occupancy should reimbursement for rural hospitals be set? What incentives for elimination of underutilized services, mergers, and sharing of services should be provided?

2. What types and levels of reimbursement for physicians and non-physician providers in rural areas are necessary to attract and retain them?

3. Should reimbursement levels be set on the basis of "system" requirements and appropriate levels of care for a community or area, or should they be provider specific? What alternatives to the "usual and customary" fee provisions for determining reimbursement levels should be used?

4. What are realistic expectations for self-sufficiency of rural health care "systems" in different settings?

5. What have we learned about the feasibility of capitation for rural primary care, with or without formal HMO-type arrangements with hospitals?

6. What is the cost-effectiveness of covering "outreach" services, such as health education, prevention, transportation, periodic visits to isolated areas? Telecommunications?

7. What reimbursement levels are appropriate for non-physician providers? What is the effect of "cost reimbursement" on productivity?

8. What effect does the non-physician provider have on the per capita cost of rural health services?

Organization and Delivery of Care

9. What is known about the relative efficiency of different modes of delivery in rural areas? Can, or should, "successful" present models be replicated? Under what circumstances? What kinds of incentives should be used?

10. What are the most efficient ways of organizing a rural health care system? Will reimbursement incentives encourage networks?

11. What standards and criteria exist or should be established to determine how rural areas should be defined for planning and reimbursement purposes?

12. What types of organization and provider combinations are functional in rural areas? Optimal?

13. What models of medical care in rural areas are appropriate to incorporate the entire range of medical services?

14. What degree of "market penetration" have rural health programs achieved? What has been the impact on the average number of services provided and the average number of people using services?

V. RESEARCH PAST, PRESENT & FUTURE

In order to gain some perspective on the preceding discussions and appreciate how much is known or not known about rural health, it is important to review several basic principles related to research methodologies.

Establishing an association between two variables, regardless of how high the level of statistical significance, is not equivalent to showing that one causes the other. The majority of data on rural health, as well as most studies of health care in general, offer only associations. (Cochrane 1972) Far too few of these studies have been planned in advance of, or as a major component of the demonstration effort they have later evaluated. As a result, few have the necessary data to show a change before and after the project, or to compare this change with that in a control group. In some instances it has been possible to approach this research model by making use of extant data sets, but these cases are conspicuously rare.

Another problem with research and evaluation efforts to date has been the small number of projects available for examination. Many studies are forced to use highly selected cases from which it is difficult to generalize. The very willingness of some groups to participate may distinguish them from the others.

In some studies, statistical models (usually regression analysis) have been utilized to explain the relationship of different variables to the variable of major interest. These models are designed to have predictive value, but to maximize reliability they should be tested on a second set of data. It is an unusual instance, however, where a second set of data is available or where the first set can be partitioned to allow for both development and testing. For example, a study done to predict utilization of services might use a set of proxy variables together with some site-specific factors. But by the time the common factors across sites are considered, the number of projects eligible for study becomes quite small.

Many studies of health providers, particularly those involving their location decisions, are retrospective. Having made a decision, the individual is then asked why (s)he did so, or persons who chose one location are compared to persons who chose a different one; few studies control for basic differences in the two groups prior to making the decision. This is another example of how a prospective model that follows a group over time would yield more useful data than a single cross-sectional or retrospective view or even than a series of cross-sectional analyses.

When we talk of rural health research, therefore, we are in all likelihood referring to studies which describe programs and assess their effects. Occasionally we come across some work that attempts to account for differences found across a number of sites. It is rare, if not impossible, however, to find true experiments with appropriate random designs. This is not unique to rural health care research; it is true of much of social research where programs are expensive and participation requires complex decisionmaking.

Awareness of these methodological shortcomings notwithstanding, it seems unlikely that many scientific experiments will be possible in the future. Conclusions and program policy formulation will probably continue to be based on this type of retrospective analysis. High statistical correlations taken from a study have less impact on most decisionmakers than evidence that a particular project seems to be meeting its goals and satisfying the consumers. The scientific findings that thrill the researcher and provide grist for the theorist's mill may offer little guidance in designing a program or formulating a policy. It is hard to predict the weather if you know only that it will rain three days out of seven, even if that represents a fascinating meteorological phenomenon.

That is not to argue, however, that no attempt should be made to change the design and implementation of future research. If we are going to know more five years from now than we know today, we must plan for research. One of the most important initial steps is to involve the evaluators at the outset. One important policy issue well worth discussion is the extent to which service programs should be pilot-tested

and evaluated before they become promulgated. At a minimum, adequate provision should be made to gather sufficient and appropriate evaluation data on the initial groups of projects begun. Perhaps fewer, better designed projects are appropriate. With a little foresight and careful planning much of the information needed for baseline data could be incorporated into the application requirements. A lagged introduction of selected sites would provide more equivalent control groups. Baseline data are essential in showing change over time but a control group is equally important if a change is to be attributed to the putative cause. There is no shortage of design models; program evaluation has become a sophisticated art. (Campbell & Stanley 1966, Cook and Campbell 1976) Furthermore, opportunities to examine larger cross-sections of the national rural health map are particularly important in view of these limitations in scope and design. Only in this way can we contrast and compare across settings and begin to look at the common threads and unique attributes to test our theories about what works under what conditions to achieve what ends.

Meanwhile, research on rural health continues. The descriptions of some of the contracts and grants shown in Table 6 suggest that some new answers may become available. Although this is only a partial listing, it provides a sense of the number of different agencies and institutions involved in the support of various aspects of rural health research. However, there remains a need for increased emphasis on prospective studies, cross-program analyses and model-building.

All new research efforts should be preceded by a thorough examination of the criteria to be used in identifying a successful program. Though it may be socially desirable to address questions of access, a more pragmatic beginning would employ some combination of increased utilization and economic self-sufficiency. This dual definition suggests a strategy for examining the series of rural health efforts. Extant data allow us to assess the self-sufficiency of the various projects as a first cut. The universe can thus be separated into the sufficient and the non-sufficient with perhaps a third category for projects too young to be expected to have reached the point of self-sufficiency.

Table 6. Summary of Illustrative Rural Health Evaluation Contracts & Grants in Progress

Title	Type of Award	Description
Comparative evaluation of Independent NHSC & ARC sites HSA-240-OA-45(7)	HSA/C	(1) to identify factors which enable and/or constrain a provider of comprehensive ambulatory primary care services to become independent delivery systems without direct federal support; (2) to develop a model of "independence" which when applied to federally supported projects can indicate their potential for success; and (3) to make policy recommendations which would assist program managers (BCHS) to more effectively impact upon underserved areas by improving the probability of independence.
RHI Evaluation Study HSA-240-OA-49(7)	HSA/C	(1) to develop a comprehensive approach toward classification and analysis of Rural Health Initiative (RHI) sites to assess their collective progress toward program goals; and, (2) to continue to expand and improve a longitudinal comparison of the economic performance of categorical sites to RHI systems in terms of productivity, costs, revenues, and financial self-support.
CHMSA Designation & Physician Manpower Requirements Study Phase III HSA-240-OA-50(7)	HSA/C	To further develop and modify a physician distribution prediction model from which the number of Critical Health Manpower Shortage Area (CHMSA) counties as well as the number of primary care physicians required to increase their primary care physician to population ratios to one per 2000 persons are projected through 1985. Alternative projections using different assumptions shall be derived and analyzed. This analysis will provide vital information for the planning of the National Health Service Corps (NHSC) and associated HSA programs. If validated, the model shall be institutionalized as an operational policy/planning tool.
Health Care Resources and the Use of Needed Services HS-02583-01	NCHSR/G	Linkage of population attributes, barriers to care, and use of needed services using data from household surveys from EHSDS and archival data from AHA, AMA Bureau of the Census.
Need and Use of Health Services in Underserved Areas HS-02778-01	NCHSR/G	Community survey in Region V stratified by degree of underservice to look at primary health care needs, utilization and perceived availability of care.
Estimation of spatial demand for Hospital Service HS-02714-01	NCHSR/G	Comparison of hospital mortality rates as proxy for all hospital admissions among hospitals offering secondary and tertiary care in Michigan to generate service area configurations.
Assessing the Adequacy of Health Manpower Supply HS-02790-01A1	NCHSR/G	Assessment of the effect on mortality rates of physician supply as contrasted with environmental factors.
Evaluation of the Medical Preceptorship Program HRA-231-76-0040	BHM/C	Assess development and operational experience of preceptorship programs (both elective and required) in 92 medical schools and assess effects of programs on students' future career choices regarding type and location of practice.
An Analytical Study of Physicians' Career Decisions Regarding Specialty Choice and Geographic Location HRA-231-77-0088	BHM/C	Analyze effects of socialization at various stages of physicians' careers. Variables to be examined include: community of origin, undergraduate college, medical school, residency training and current practice situation (including organizational and community milieu).
Project TALENT Physician Career Development Study HS-02626-01A1	NCHSR/G	Study of physician career pattern determinants from high school forward with emphasis on geographic and specialty choices. Special attention will be paid to women and minorities.
Analysis of the Financial Needs of Service Programs in Rural areas ID #3362	RWJF/C	(1) identify well-managed and medically effective free-standing medical service programs; (2) examine the financial viability and patterns of delivery of these programs; (3) determine the extent to which current reimbursement fails to cover the reasonable costs of providing services at these sites; and (4) recommend changes in current reimbursement formulas to allow well-managed and medically effective programs to operate without receiving large subsidies from private philanthropy or public agencies.
Rural Volunteer Emergency Medical Coordination 1R18 HS 02 507	NCHSR/G	Evaluation of the usefulness of trained volunteer Emergency Medical Coordinators for medically isolated rural areas as first responders to medical emergencies. The EMC provides care and services as a community organizer for EMS.
A Study to Evaluate and Compare Four Organizational Approaches to the Delivery of Primary Health Care in the Appalachian Region ARC 77-206	ARC/C	Comparison of 1) free-standing clinics, 2) centrally managed networks, 3) clinics linked to public health departments and 4) hospital based clinics. Will look at improved access, relative cost, other administrative and capital cost and long-term financial viability.
Evaluation of Rural Practice Project	RWJF/C	Examines rural practice sites sponsored by RWJF to look at 1) program variables; characteristics of professional personnel, program content, program organization and administration and program's relation to community and 2) program outcomes: and appropriateness of service, quality, program institutionalization, impact on other providers and perceptions of clients.

LEGEND: HSA Health Services Administration
NCHSR National Center for Health Services Research
BHM Bureau of Health Manpower
ARC Appalachian Regional Commission
RWJF Robert Wood Johnson Foundation
G Grant
C Contract

Using information available from project reports and applications we can carry out an initial analysis which would establish several independent and confounding variables. It is important to classify the projects to examine the comparability across programs. The derived classification system can then be used to compare the success of projects arrayed as a matrix of major characteristics and programmatic support. In addition to the archival data, a series of government contracts have supported the development of data files that link together information from the census and other national surveys, much of which is available at the level of counties or can be re-aggregated into district planning areas. Table 7 indicates the type of variables that might be addressed.*

It is important to appreciate that no series of regression equations or the equivalent, will capture the flavor of rural health programs or even identify the most critical variables. The overview approach is intended simply as a preliminary screening to search for patterns of similarities and differences. From this montage, a stratified sample of projects can be drawn for more intensive study. Included in the sampling design should be strata representing program type, region and preliminary success score. A sample of 80 projects could provide one high and one low success for each program type in each region. It is likely, however, that all possible cells cannot be filled by even a single program.

The projects selected for more intense study would be the focus of specific data collection activities including a community survey, a survey of patients served by the project, a survey of the project staff (both past and present), a review of project patient records and a comprehensive audit of the financial and organizational aspects of the project. Sample questions are shown in Table 8.

Two concepts lie deep in the heart of every evaluator-researcher: a control group and baseline data. Although the design presented relies on neither, it is not because these ideas are not valued. Rather the present design recognizes that research on service programs will

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*Tables 7 and 8 were prepared in collaboration with Dr. Robert Eichhorn, Purdue University.

Table 7: National Evaluation of Federal Rural Health Programs (RHI, HURA, NHSC, FHC/CHC)

(Questions, data sources, data elements)

Questions	Data Sources	Data Elements
1. How comparable are the programs in terms of the screening and selection process?	Program administration files. Interviews with program officers.	Program descriptions, selection criteria, funding decisions (refusal rate), technical assistance, new vs. existing (enlarged) programs, scope of benefits covered, fate of unfunded projects.
2. How comparable are the programs in terms of population to be served and the available community resources?	Census of population (updated), public health statistics (including NHIS and NAMCS survey results, special studies (RMP, CHP, HAS), local and national inventories of health care resources, Medicare and Medicaid records. Interviews with key participants and examination of the files.	Demographic characteristics (age, sex, race, SES, region, etc.), mortality and morbidity experience, adjusted utilization rates. Health care resources (manpower, facilities, services, etc.), or linkages with other institutions. History of the community (e.g., M.D. turnover, recruitment history, evidence of community cooperation on other projects, e.g., bond issues, federal grants-in-aid, etc.)
3. What is the crude success rate?	BCHS common reporting requirements. Project files. OPEL reports.	Still operating after 2 years. Level of funding independence. Increase in number of people served. Increase in number and type of services given.
4. What factors are associated with this success score?	BCHS common reporting requirements Project files OPEL reports	Type and mix of providers. Community support. Other health resources. Special population characteristics. Participation with other institutions. New vs. expanded project.

Table 8: Field Study of Stratified Sample of Federal Rural Health Programs

(Questions, data sources, data elements)

Questions	Data Source	Data Elements
1. Have the utilization patterns changed? (More services, different services, new or different patients, etc.)	Community survey Clinic record review	Demographic characteristics Need for services Use of services Barriers to care Usual source of care (service area) Satisfaction with care
2. Are the services more convenient, comprehensive, continuous, coordinated?	Survey of patients Patient record review	Travel time Waiting time Usual source of care Satisfaction with care Continuity score Family coverage Referral follow-up Preventive care Participation in record keeping
3. What is the scope of services provided?	Patient record review	Patient characteristics (age, sex, race, etc.) Services provided
4. Are physicians (and staff) satisfied with the quality of their practice life?	Personnel survey NHSC exit interviews	Staff characteristics (type, number, experience and training, origins, etc.) Access to laboratory and diagnostic services Participation in continuing education and collegial relations Retention Integration in community and leadership Satisfaction with organization and administrative arrangements
5. How efficiently is the clinic organized?	Task and organizational analysis	Organizational structure Tasks performed by staff
6. Is the practice financially viable?	Audit of the practice	Revenues and expenses Sources of payment Fee structure Adjustment and collection rate Non-reimbursable services Production

not have the same priority as the provision of services and must, except in very unusual circumstances, be prepared to work retrospectively.

The absence of baseline data on the projects of interest and a set of control communities will impose real limitations on the breadth of conclusions possible, but comparisons between successful and unsuccessful projects should discriminate important areas of difference. In some cases it may be possible to re-create some of the issues usually found in baseline data from existing records. For example, previous utilization of medical care may be part of the patient's past history or a community survey could focus on present patterns and changes in those during the period of interest.

Some form of community survey is essential if actual impact is to be assessed. Focusing exclusively on those that use the project will miss important measures of market penetration. Similarly it may be useful to distinguish between utilization of a new service and attitudes toward it. Projections of self-sufficiency and stability will require measures of the providers' satisfaction as well as the consumers'. Issues such as scope of services expected and demanded, quality of care, congruence of internal standards and external realities may play a significant role in determining the provider's sense of accomplishment. Certainly many of these will impinge directly on the issue of financial self-sufficiency.

On-site gathering of information is critical in assessing new programs. Direct interaction with participants provides even more data than may at first be appreciated. Very often the key elements that can be gleaned from quantitative analysis can be interpreted properly only in the light of certain qualitative facts that require direct observation. Visits to a sample of successful and unsuccessful clinics can be used to gather information from clinic records and direct observational and interview data from the project staff and significant members of the community. Perceptions define an individual's reality and form the basis for his actions. It is essential that one be able to distinguish what is actually being done and how it is viewed by both those giving and those receiving the service. The perceptions themselves, the extent of concordance between provider and consumer, and the external judgment of the state of events can all be used as important variables in discriminating success from failure.

These recommendations for a new approach to an effective rural health care research program suggest the need for reorganization and cooperation among the various departments, agencies and institutions involved. For such a task to be successful, it will require a coordinating body, one situated within the federal health establishment, probably within DHEW, at a level high enough to transcend any existing individual program interests.

One very useful step which could be taken immediately would be to establish a clearinghouse within this coordinating body. This clearinghouse should not only compile all rural health research information; it should also be capable of analyzing this material both for content and for adequacy of method.

The federal coordinating body should be complemented by an outside advisory board composed of individuals who have had specific experience both in the delivery of services in rural health care programs and in the research and evaluation of these programs. They should be selected so that the wide spectrum of rural America--both in geographic and in socio-economic terms--is represented. This board would serve to advise the federal coordinating unit about research programs and might also review grant proposals.

The most effective way of gathering new data for the evaluation program would be to establish a research consortium of four or five institutions in representative areas of the country. Members of the consortium would form a steering committee responsible for maintaining high levels of operation at the various sites and establishing uniform methods of data collection and analysis. All analysis and data processing of the consortium would take place at one location, either within or external to the federal coordinating body.

Obviously, implementing these vital research and evaluation endeavors demands a substantial financial investment. It will undoubtedly necessitate specific appropriations to supplement the one percent evaluation funds already mandated for this purpose. However, regardless of the requisite investment, it will pale in comparison to the amount of money currently being spent on rural health care--a huge investment which still leaves us uncertain as to when, or where, or if, it is being effectively and efficiently spent.

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